

REMARKS

Claims 1-28 are pending in the present application. Claims 1-4, 8, 10, 13-21 and 25-28 are rejected and claims 4-7, 9, 11, 12 and 22-24 are objected to. New claims 29-60 have been added. Support for these claims can be found throughout the specification and no new matter is introduced. Reconsideration and withdrawal of the rejection is respectfully requested.

Objections of Claims 5-7, 9, 11, 12, 22-24

Claims 5[sic]4-7, 9, 11, 12, 22-24 are objected to because they are based on a rejected claim. These claims have now been either rewritten in independent forms or amended their claim dependency so that they are no longer dependent on a rejected claim. The objections to these claims are believed to be overcome.

Objection Under 37 C.F.R. § 1.75(c)

Claim 8 is objected to under 37 C.F.R. § 1.75(c) as being of improper dependent form and because the term “hydroperoxide” is indefinite (because the word is misspelled).

Claim 8 has been rewritten in independent form.

Claim 8 is further amended and the correct term “hydroperoxide” is now added. Attached herewith is a copy of information relating to *tert*-butyl hydroperoxide from the National Toxicology Program [website: ntp-server.niehs.nih.gov/htdocs/Results_status/ResstatB/10405-A.html]. The objection is believed to have been overcome.

35 U.S.C. § 112 Rejection

Claims 16-18, 20 and 25-28 are rejected under 35 U.S.C. § 112, second paragraph. According to the Examiner, a) claims 16-18 are alleged to use a trade name; b) claim 20 is alleged to contain a term “any one or more of acetone and methanol” that is indefinite; and c) claims 25-28 contain an indefinite phrase (substantially).

a) Applicants respectfully submit that OXONE® employed in examples are not only identified by trademark name, but that the application clearly sets forth its identity. The information, the source company for “OXONE®” is fully disclosed in the original application. Applicants direct the examiner’s attention to the specification for a proper description of “OXONE® —“ “OXONE®” refers to a trademark name for an oxidizing agent under Du Pont for an acidic, white,

granular, free-flowing solid containing the active ingredient potassium peroxymonosulfate.” (See, specification, page 6, lines 5-7). The Du Pont “OXONE®” product was available to the public in the U.S. at the time this application was filed, and is generally known to those skilled in the subject filed of chemistry.

Accordingly, applicants submit that the trademark OXONE® has a fixed and definite meaning and the present specification further provides identification by scientific and sufficient explanatory language. Pursuant to MPEP § 608.01(v), the examiner is authorized to permit the use of such a trademark. Claims 16-18 have been amended to properly recite the trademark name. Applicants respectfully request that the Examiner withdraw this rejection.

b) The phrase “any one or more of acetone and methanol” in claim 20 has been amended to the term “at least of” which has the same meaning.

c) The term “substantially” has been deleted from the claims 25-28. The rejection is believed to be overcome.

35 U.S.C. § 102 (b) Rejection

Claims 25-28 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by WO 99/29299 (Linder et al.). Claims 25-28 (product-by-process claims) have been amended to recite a purity level of less than 4.5% sulfone when prepared using the oxidizing agent of *tert*-butyl hydroperoxide. Support can be found on page 5 of the specification.

New product-by-process claims 54-61 have been added and they recite a purity level of less than 0.5% and less than 0.2% sulfone when prepared using the oxidizing agents of OXONE® or potassium peroxymonosulfate. Support can be found on page 9 of the specification.

35 U.S.C. § 103(a) Rejection

Claims 1-3, 8, 10, 13, 14, 15 and 16-21, stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 5,039,806 (“the ‘806 patent, by Brandstram et al.) Applicants respectfully traverse the rejection and submit that none of claims 1-3, 8, 10, 13-15 and 16-21 are rendered obvious by the cited reference.

The ‘806 patent generally discloses preparation of pyridyl methylsulfinyl benzimidazole compound. The disclosed genus is extremely large; for example, having at least R₁-R₈ and R₁₅

functional groups with each further subdivided into different subgroups. While the '806 patent discloses many thousands of benzimidazole compounds, it fails to disclose the claimed reactants.

Applicants further submit that the '806 patent fails to teach or suggest the presently claimed oxidizing agents. Accordingly, the 103 rejection must fail because the cited references neither disclose nor suggest at least two claimed elements. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Furthermore, the Examiner does not point to any motivation or suggestion in '806 patent to select the claimed reactants or oxidizing agents for the claimed selective oxidation. Absent some teaching or suggestion, explicitly or implicitly found in the '806 patent, that would motivate one of skill in the art to make the claimed combination the *prima facie* obviousness rejections must fail.

For at least the foregoing reasons, Applicants respectfully submit that the present invention is not obvious over the '806 patent and that the rejections of claims 1-3, 8, 10, 13, 14, 15 and 16-21 should be withdrawn.

35 U.S.C. § 103(a) Rejection

Claims 1-4 stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over WO 99/47514 by Brennan et al. (the '514 application). Applicants respectfully traverse the rejection and submit that none of the claims is anticipated by, or rendered obvious over, the cited reference.

The '514 application teaches using a perborate salt in a liquid diluent at a pH in the range of 7.5 to 14 at a temperature in the range of 0°C to the boiling point of the liquid diluent to oxidize the thioether to form the corresponding thioester. The '514 application explicitly states that the sodium perborate is chosen because it is cheap and non-hazardous.

Applicants respectfully submit that the '514 application fails to disclose the claimed reactants. The '514 applicant also fails to disclose the claimed oxidizing agents. Accordingly, the 103 rejection must fail because the cited reference neither disclose or suggest at least two claimed elements.

Furthermore, the '514 does not provide suggestion or motivation to select the claimed reactants or oxidizing agents for the claimed selective oxidation. Absent some teaching or suggestion, explicitly or implicitly found in the '514 application, that would motivate one of skill in the art to make the claimed combination the *prima facie* obviousness rejections must fail.

For at least this reason, Applicants respectfully submit that the present invention is not obvious over the '514 application and that the rejections of claims 1-4 should be withdrawn.

Submitted herewith is WO 99/47514 A1 which was inadvertently omitted from the IDS filed June 10, 2002.

CONCLUSION

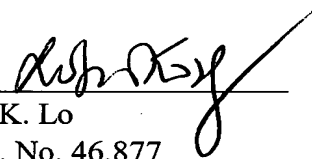
Applicants respectfully request reconsideration and withdrawal of the rejections set forth in the August 13, 2002 Office Action and allowance of the present application. The Examiner is invited to contact the undersigned at (212) 908-6018 to discuss any matter concerning this application.

Respectfully submitted,

KENYON & KENYON

Dated: February 13, 2003

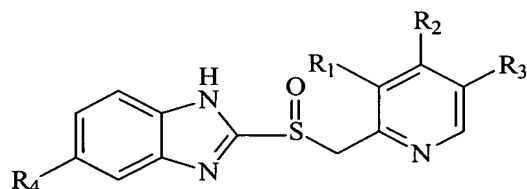
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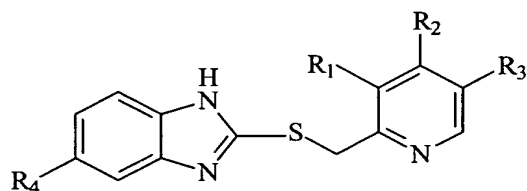
MARKED-UP VERSION TO SHOW CHANGES MADE

1. (Amended) A process for preparing a thioester compound of formula A:



A

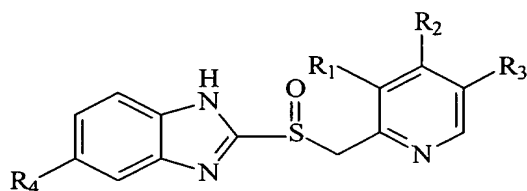
wherein R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl, comprising reacting a thioether compound of formula B



B

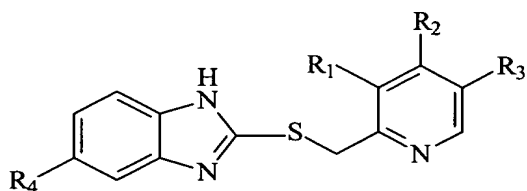
wherein R₁ through R₄ are as in formula A, with an oxidizing agent selected from the group consisting of *tert*-butyl hydroperoxide in the presence of a catalyst, OXONE[®] and potassium peroxymonosulfate to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A.

4. (Amended) [The process according to claim 1,] A process for preparing a thioester compound of formula A:



A

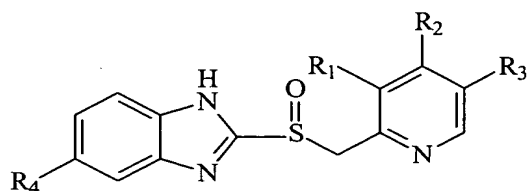
wherein [R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl] R₁ is methyl; R₂ is methoxy; R₃ is methyl; and R₄ is methoxy, comprising reacting a thioether compound of formula B



B

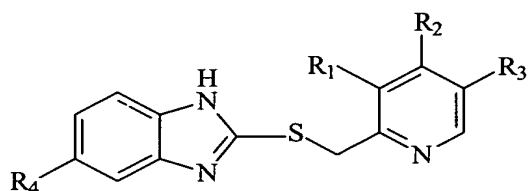
wherein R₁ through R₄ are as in formula A, with an oxidizing agent to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A.

5. (Amended) [The process according to claim 1,] A process for preparing a thioester compound of formula A:



A

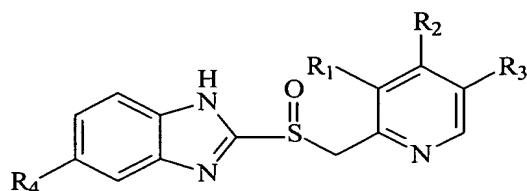
wherein [R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl] R₁ is methyl; R₂ is 2-trifluoroethoxy; R₃ is hydrogen; and R₄ is hydrogen, comprising reacting a thioether compound of formula B



B

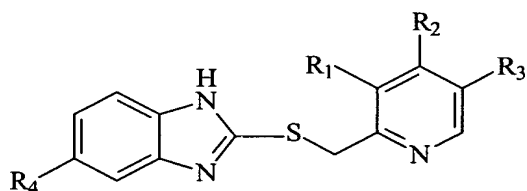
wherein R₁ through R₄ are as in formula A, with an oxidizing agent to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A.

6. (Amended) [The process according to claim 1,] A process for preparing a thioester compound of formula A:



A

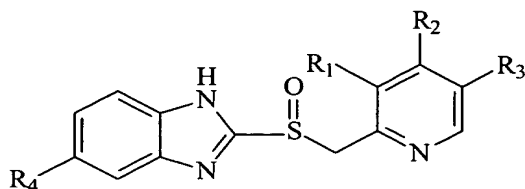
wherein [R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl] R₁ is methoxy; R₂ is methoxy; R₃ is hydrogen; and R₄ is difluoromethoxy, comprising reacting a thioether compound of formula B



B

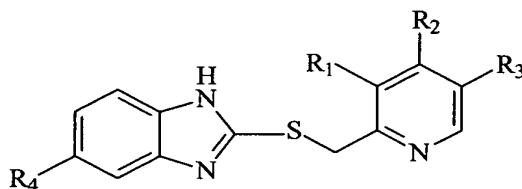
wherein R₁ through R₄ are as in formula A, with an oxidizing agent to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A.

7. (Amended) [The process according to claim 1,] A process for preparing a thioester compound of formula A:



A

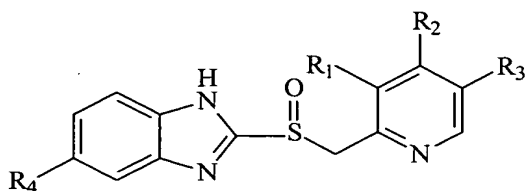
wherein [R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl] R₁ is methyl; R₂ is MeOCH₂CH₂CH₂O; R₃ is hydrogen; and R₄ is hydrogen, comprising reacting a thioether compound of formula B



B

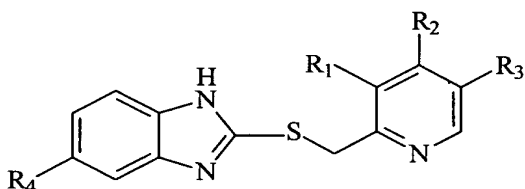
wherein R₁ through R₄ are as in formula A, with an oxidizing agent to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A.

8. (Amended) [The process according to claim 1, wherein the oxidizing agent is] A process for preparing a thioester compound of formula A:



A

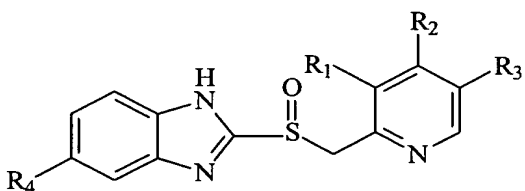
wherein R_1 , R_2 , and R_4 are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R_3 is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl, comprising reacting a thioether compound of formula B



B

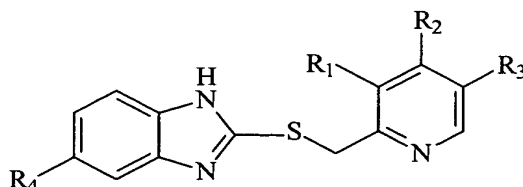
wherein R_1 through R_4 are as in formula A, with *tert*-butyl hydroperoxide in the presence of a catalyst to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A.

9. (Amended) [The process according to claim 8,] A process for preparing a thioester compound of formula A:



A

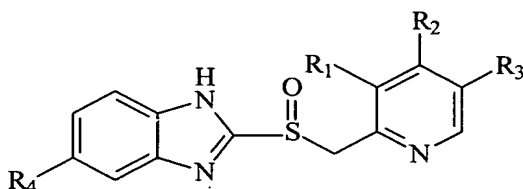
wherein R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl, comprising reacting a thioether compound of formula B



B

wherein R₁ through R₄ are as in formula A, with [an oxidizing agent] *tert*-butyl hydroperoxide in the presence of a catalyst to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A,
wherein the catalyst is selected from the group consisting of vanadyl bis-acetylacetonate, sodium meta-vanadate and vanadium pentoxide.

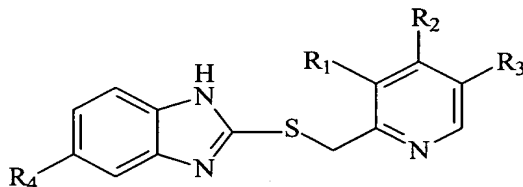
11. (Amended) [The process according to claim 8,] A process for preparing a thioester compound of formula A:



A

wherein R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group

consisting of hydrogen and substituted or unsubstituted lower alkyl, comprising reacting a thioether compound of formula B

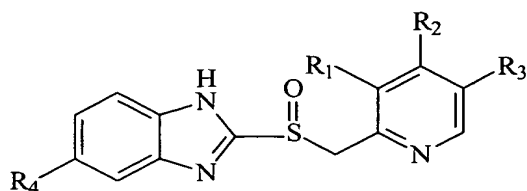


B

wherein R₁ through R₄ are as in formula A, with [an oxidizing agent] *tert*-butyl hydroperoxide in the presence of vanadyl bis-acetylacetonate to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A,

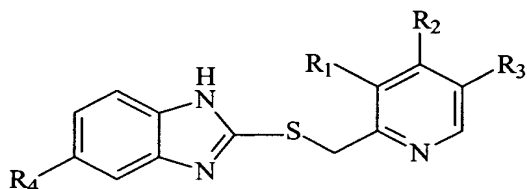
wherein the catalyst is vanadyl bis-acetylacetonate.

12. (Amended) The process according to claim [8]11, wherein the vanadyl bis-acetylacetonate and the compound of formula B is in the molar ratio of about 0.01 to about 0.6.
16. (Amended) The process according to claim [8]1, wherein the oxidizing agent is [Oxone[®]] OXONE[®].
17. (Amended) The process according to claim 16, wherein the molar ratio between [Oxone[®]] OXONE[®] and the compound of formula B is about 1.25-1.6 to about 1.
18. (Amended) The process according to claim 16, wherein the molar ratio between [Oxone[®]] OXONE[®] and the compound of formula B is about 1.4-1.6 to about 1.
20. (Amended) The process according to claim 16, wherein the oxidation is performed in the presence [any one or more] of at least one solvent wherein the solvent is selected from the group consisting of acetone [and], methanol and a mixture thereof.
22. (Amended) [The process according to claim 16,] A process for preparing a thioester compound of formula A:



A

wherein R₁, R₂, and R₄ are each selected from the group consisting of hydrogen, substituted or unsubstituted lower alkyl and substituted lower alkoxy; and R₃ is selected from the group consisting of hydrogen and substituted or unsubstituted lower alkyl, comprising reacting a thioether compound of formula B



B

wherein R₁ through R₄ are as in formula A, with [an oxidizing agent] OXONE® to produce selective oxidation of the thioether compound of formula B to form the thioester compound of formula A,

wherein the oxidation is performed in a two-phase system selected from (CH₂Cl₂/H₂O) and (ethyl acetate/H₂O).

23. (Amended) The process according to claim [16] 22, wherein the oxidation is performed in the presence of phase-transfer[red] catalyst.
24. (Amended) The process according to claim [16] 23, wherein the [oxidation is performed in the presence of] phase-transfer catalyst is *tert*-butyl ammonium bromide.
25. (Amended) Omerprazole [substantially free of sulphone by-product] having less than about 4.5% sulfone prepared as in any one of claims 1, 4, [8 or 16] or 8.

26. (Amended) Lansoprazole [substantially free of sulphone by-product] having less than about 4.5% sulfone prepared as in claim 1, 5, [8 or 16] or 8.
27. (Amended) Pantoprazole [substantially free of sulphone by-product] having less than about 4.5% sulfone prepared as in claim 1, 6, [8 or 16] or 8.
28. (Amended) Rabeprazole [substantially free of sulphone by-product] having less than about 4.5% sulfone prepared as in claim 1, 7, [8 or 16] or 8.